# Final Project Report to the NYS IPM Program, Agriculture IPM 2002-2003

## Title:
Alternative Fly Control Methods for Pastured Livestock

## Project leader:
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## Cooperators:
Phillip Kaufman Ph.D., Cornell University, Keith Waldron, NYS IPM Program.

## Participants:
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## Type of Grant:
Biological control and pest biology.

## Abstract:
Steuben County has many dairy and livestock producers who are looking for alternatives to insecticides for controlling pests on pastured livestock. Insecticides are not always effective and many farmers wish to reduce pesticide use. Two possible alternatives are the Epps Biting-Fly Trap and a chain harrow to break up manure pats.

The Epps Biting-Fly Trap has been identified as a possible control method that does not rely on insecticides to control flies. The Epps trap catches horse flies (green heads, bull flies, and yellow flies), deer flies, the stable fly, and other insects. Very few of these traps have been used in New York. It was our intent to make producers more aware of alternative pest control methods by demonstrating the use of the Epps Fly Trap.

Using a harrow is very effective at disrupting larval development. Flies and other pests lay their eggs in fresh dung pats. Breaking up the dung pats disturbs the growing larva's environment and results in their death. Contradicting beliefs on the benefits of harrowing exist amongst grazers with many believing that animals will not feed in areas where dung pats have been redistributed. This project will help to determine if harrowing is beneficial or harmful to pasture utilization.

Convenience of use became an overriding issue with both the Epps trap and harrow. We concluded that the time requirement for using the chain harrow through the grazing season is too great, and therefore it is not a practical fly control option for most farmers. The Epps trap worked well and was convenient when located near a water source.

## Background and Justification:
Pest control on dairy and livestock operations is challenging. Most control methods involve the use of insecticides. Insecticides are less effective at controlling pests on pastured livestock compared to confined livestock. In recent years producers with pastured livestock have begun looking for effective alternative insect control methods.

The primary insect pests of pastured cattle differ greatly from those affecting confined cattle. Pastured cattle pests fall into two categories. Those that develop in undisturbed cattle dung

and subsequently attack cattle, and those that develop elsewhere and attack cattle. The face fly and horn fly develop exclusively in undisturbed pastured cattle dung pats. These flies are highly pestiferous as adults and are difficult to control with insecticides; however, they are highly susceptible to disruption of larval developmental sites. Stable flies and horse flies are both painful, blood-feeders as adults, but each develop in very different environments. Stable flies prefer moist, rotting organic matter that is also in contact with soil. Horse flies develop in aquatic environments (streams and marshes), quite distant from agriculture. There is little that can be done to combat stable fly breeding (in a pasture setting) and nothing that can be done to prevent horse fly development. Therefore, we are left with adult management of these two pests. Insecticides are largely ineffective against the stable flies that feed on the lower legs of cattle and insecticides do not kill adult horse flies. Therefore, trapping of adult stable and horse flies has become the preferred method for management of these pests. Unfortunately, trapping technology has not provided producers with much relief. However, new traps have recently become available that show great promise in relieving the stress on animals caused by these flies.

The Epps Biting-Fly Trap has been identified as a possible control method that does not rely on insecticides to control flies. The Epps trap catches horse flies (green heads, bull flies, and yellow flies), deer flies, the stable fly, and other insects. The trap manufacturer states that one trap will provide effective control over an area covering up to 40 acres. Very few of these traps have been used in New York. It was our intent to make producers more aware of alternative pest control methods by demonstrating the use of the Epps Fly Trap. Additional trap technology was demonstrated at the field day discussed below.

A second non-insecticide control method is using a harrow to break up dung pats. Using a harrow is very effective at disrupting larval development. Flies and other pests lay their eggs in fresh dung pats. Breaking up the dung pats disturbs the growing larva's environment and results in their death. The harrow is easily pulled behind a tractor or ATV, and is quick and easy to use. Unfortunately, few livestock producers own chain harrows because they are unaware of their effectiveness for fly control on pasture. Contradicting beliefs on the benefits of harrowing exist amongst grazers with many believing that animals will not feed in areas where dung pats have been redistributed. This project will help to determine if harrowing is beneficial or harmful to pasture utilization.

## Objectives:

Setup and demonstrate the use of the Epps Biting-Fly Trap in an actual farm setting.

Setup and demonstrate the use of a chain harrow for breaking up manure pats as a method to control flies on pastured cattle. Determine if livestock grazing behavior is affected as a result of harrowing pastures.

Host a field day where fly control options for pastured cattle, including the Epps Fly Trap and chain harrowing will be discussed. Provide information to dairy and livestock producers regarding the identification and lifecycles for major fly pests of pastured cattle, and IPM-based fly control strategies.

Project evaluation

## Procedures:

Three dairy farm cooperators were identified in April to receive an Epps trap. Two of these farms also received a harrow. The project leader met with each cooperator and explained how to use and maintain the Epps trap and the harrow. The project leader was responsible for

overseeing that the traps were being maintained properly and for making pasture measurements on the farms with the harrows. A meeting dedicatedly solely to livestock fly control was held at Farm C on July 20, 2002. Keith Waldron, NYS IPM and Phil Kaufman, Cornell Entomologist were the featured speakers for this event. A farm tour was held on Farm A in June, and a Pasture walk was held at Farm B in August. At both of these meetings the project leader explained the project and described how the traps and harrow work to control flies.

Several measurements of pasture paddocks were taken before and after the cattle grazed them. Visual observations were made for any uneaten, presumably fallowed areas of the paddocks, along with using a pasture stick to measure grass height and paddock forage dry matter content. A survey of the participating farms was used to help evaluate the results of the project at the completion of the fly season. The project leader compiled an exit survey for the cooperators to complete. The survey was conducted in October of 2002.

| Farm | Trap setup date | Removal Date | Trap location | Harrowing began |
|---|---|---|---|---|
| A | 5/15/02 | 9/26/02 | Next to barn & pasture laneway | n/a |
| B | 5/17/02 | 9/26/02 | In the center of the pasture. | 6/2/02 |
| C | 5/23/02 | 9/26/02 | Outside pasture, near water source area | 7/20/02 |

## Results and Discussion:

The following table is a summary of the cooperator's opinions regarding the Epps trap.

| | Farm A | Farm B | Farm C |
|---|---|---|---|
| *Was the trap easy to use?* | Yes | Yes | Yes |
| *Was it convenient to keep full of water & to clean?* | During hot weather the water evaporated quickly, being located near water source was important | No, the trap was too far from a water source. Cleaning was not difficult | Yes, children took care of the trap, and it was near a water source |
| *Was the trap effective at controlling biting flies?* | Somewhat | No, should have been closer to the barn | Yes, based on the number found in the trap |
| *Compare the fly population this year to previous years* | Lower to average population, only bad in July and August | Lower, never saw cattle running due to being bitten, as had been seen in previous years | Early summer – lower Later summer – Average, also did not see heifers running due to being bitten by flies |
| *What methods of fly control have you used in the past?* | Commercial company sprays barn (this was done this summer) | Aerosol spays on cows, sugar bait traps in barn | Dust bag (not used this year) |
| *Comment on the use of pesticides? Did the trap perform as well as insecticides?* | Not bothered by using insecticides, feels insecticides kill more flies | Not bothered by using insecticides, found sprays to be more effective | Wanted to decrease usage of all chemicals, wants to be organic, but unsure if trap was better than insecticide controls. |

| | | | |
|---|---|---|---|
| *Were you happy with the results?* | Surprised how many it actually did catch | No | Yes |
| *Would you use the trap again?* | Yes | Yes, in a different location | Yes |
| *Would you ever consider purchasing your own trap?* | No | No | Yes |

Farm B's trap was placed in the center of the pasture as recommended by the manufacturer. The other two traps were not located in the pasture, but near laneways. Farm B's trap caught the fewest amount of flies and was the hardest to maintain. Farm B was the least satisfied with the Epps trap. Farm A and C found it more convenient to maintain their traps, due to the close proximity of a water source. Therefore for ease of use it may not be in the cooperator's best interest to place the trap in the center of the pasture. With a rotational grazing system the cattle are only in and near the paddock with the trap a few days each month. Therefore it may be better to place the trap near the laneway, barn, or frequently used water source for best results.

The following table is a summary of the cooperator's opinions regarding the harrow.

| | **Farm B** | **Farm C** |
|---|---|---|
| *How often did you use the harrow?* | Used it on every other paddock from June through August | Due to bad weather was only able to harrow 1 paddock |
| *How long after cows left did you harrow?* | With in 2-3 days | Next day |
| *Was the harrow convenient?* | Yes, but it was time consuming and difficult to keep up with when field work needed to be done. | No, started up a second farm a few miles away and tractors needed to be at that farm, and the ground was too wet in May and June |
| *Do you think the harrow had any effect on stable and face fly populations?* | Unsure | Unsure, but it did a nice job spreading out a dense area of manure, felt it improved fertility of pasture |
| *Will you use the harrow in the future?* | Yes, probably on a new seeding which won't be as tall as the current pasture | Yes, but as a way to spread out manure, not control flies. |

**Weather:**
The weather in Steuben County started very mild in early spring. In May and June, however, several inches of rain fell. The grass got ahead of the cows at this time. July and August were extremely hot, with over 20 days reaching 90 degrees or more. Little rain fell during these months. The pattern observed through out the county was grass growing rapidly in the early summer, getting ahead of cattle, then pastures becoming extremely dry, with the grasses being burnt back. Many grazing herds had to be pulled off their pastures in August. This pattern was observed at both cooperating farms using the harrow, making it a difficult year to experiment with the harrow.

Significant rains in early summer made the ground at Farm C extremely soft for several weeks. The soil is somewhat poorly drained in that area. The cooperator was concerned about damaging the pasture if he attempted to harrow in May and June. The cooperator on Farm C

also began milking cows at a second farm a few miles away, making it difficult to find the time and resources to harrow. For these reasons he was only able to harrow 1 paddock of his pasture. The project leader examined the paddock on 9/9/02. The heifers had not been allowed to graze the paddock since July 20th. The grass averaged 6 inches in height, however much of the grass was burnt, and very stalky. The cooperator and project leader found no piles or clumps of manure. The cooperator was happy with the harrows ability to spread the manure throughout the paddock. No other paddock measurements were taken for a comparison since the other paddocks had been grazed too closely and burned due to extremely droughty conditions.

Farm B began harrowing in early June and continued regularly through August. Measurements were taken at Farm B throughout the summer. The project leader examined paddocks for any signs of refusal. Refusal of grass was not seen at any time during the entire grazing season by the project leader or cooperator. The pasture dry matter contents are summarized below.

| | **Average dry matter (lbs)** |
|---|---|
| **Pre-grazed paddocks** | 1919.71 |
| **Grazed paddocks** | 671.30 |
| **Difference** | 1248.41 |

Due to the early rains, the grass on Farm B grew faster than the cows could eat it. The cattle were unable to catch up with the grass during the summer. Farm B grazes approximately 35 cows and they were unable to adequately graze the paddocks. Farm B was forced to clip every paddock for the entire summer. We hypothesize that the tall, dense grass may have prohibited the harrow from fouling any portions of the pasture. If the cattle were able to adequately graze the paddocks, fouling may have been detected.

## Summary:

At least 80 livestock producers saw the Epps trap and learned about fly control during the summer. A new trap was purchased later in the summer and was taken to several events as a display. Hundreds of producers and county residents saw the Horsepal Fly Trap at the Steuben County Fair, Beef picnic, and pasture walks. The Horsepal trap will be placed on Farm B next year to compare it's effectiveness with that of the Epps trap. The Horsepal is cleaner, more convenient, and less expensive than the Epps trap, making it a viable alternative.

Convenience of use became an overriding issue with both the Epps trap and harrow. We concluded that the harrow was not convenient and therefore not a practical method of fly control for grazing herds. The Epps trap demonstrated great results and was convenient when located near a water source. We plan to place the Epps traps back on farms next summer.